Abstract of the Invention

According to the invention, resist coated wafers are rapidly and uniformly cooled by a fluid that has been cooled through the Joule-Thompson effect. Fluid from a high pressure reservoir is vented into a chamber that contains the substrates. By varying the pressure difference between the reservoir and the chamber, the temperature of the cooling fluid entering the chamber can be controlled. By also controlling the flow rate through the chamber, the average temperature difference between the fluid in the chamber and the substrates may be limited, whereby more uniform cooling is obtained. While the chamber pressure is lower than that in the high pressure reservoir, the chamber pressure may still be substantially greater than atmospheric. An elevated chamber pressure raises the specific heat and residence time of the fluid in the chamber, which also promotes uniform cooling.

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